



US009411285B2

(12) **United States Patent**
Koyama et al.

(10) **Patent No.:** **US 9,411,285 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **DRIVE TRANSMISSION DEVICE AND
IMAGE FORMING APPARATUS**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/594,610**

(22) Filed: **Jan. 12, 2015**

(65) **Prior Publication Data**

US 2015/0198921 A1 Jul. 16, 2015

(30) **Foreign Application Priority Data**

Jan. 14, 2014 (JP) 2014-004071

(51) **Int. Cl.**

G03G 15/20 (2006.01)

F16H 57/04 (2010.01)

(52) **U.S. Cl.**

CPC **G03G 15/2089** (2013.01); **F16H 57/0471**
(2013.01); **F16H 57/0464** (2013.01); **Y10T**
74/19991 (2015.01)

(58) **Field of Classification Search**

CPC G03G 15/757; F16H 57/0464
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

8,548,357 B2	10/2013	Fukushima	
2011/0158711 A1 *	6/2011	Fukushima	399/297
2011/0206438 A1 *	8/2011	Igarashi et al.	400/578

FOREIGN PATENT DOCUMENTS

JP	2000-205378 A	7/2000
JP	2004-270847 A	9/2001
JP	2010-85611 A	4/2010
JP	2011-137478 A	7/2011
JP	2011-174577 A	9/2011
JP	2012-163192 A	8/2012

OTHER PUBLICATIONS

Machine translation of JP-2012-163192.*

* cited by examiner

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(57) **ABSTRACT**

A drive transmission device includes: a gear, provided with a shaft hole, for transmitting a driving force; a frame to which a fixing shaft for rotatably supporting the gear by engaging with the shaft hole is fixed, wherein during transmission of the driving force, the gear is urged in a radial direction of the shaft hole, and a predetermined region of an outer peripheral surface of the fixing shaft slides on an inner peripheral surface of the shaft hole; and a holding portion, provided in a position closer to a center of the fixing shaft than the predetermined region with respect to a radial direction of the fixing shaft, for holding a lubricant between itself and the shaft hole. The holding portion is disposed only in a position opposite the predetermined region with respect to the center of the fixing shaft.

16 Claims, 8 Drawing Sheets

